



PHYSICS POTENTIAL AND FEASIBILITY OF UNO

JUNE 2003

Henderson Mine: A Candidate Site for UNO?

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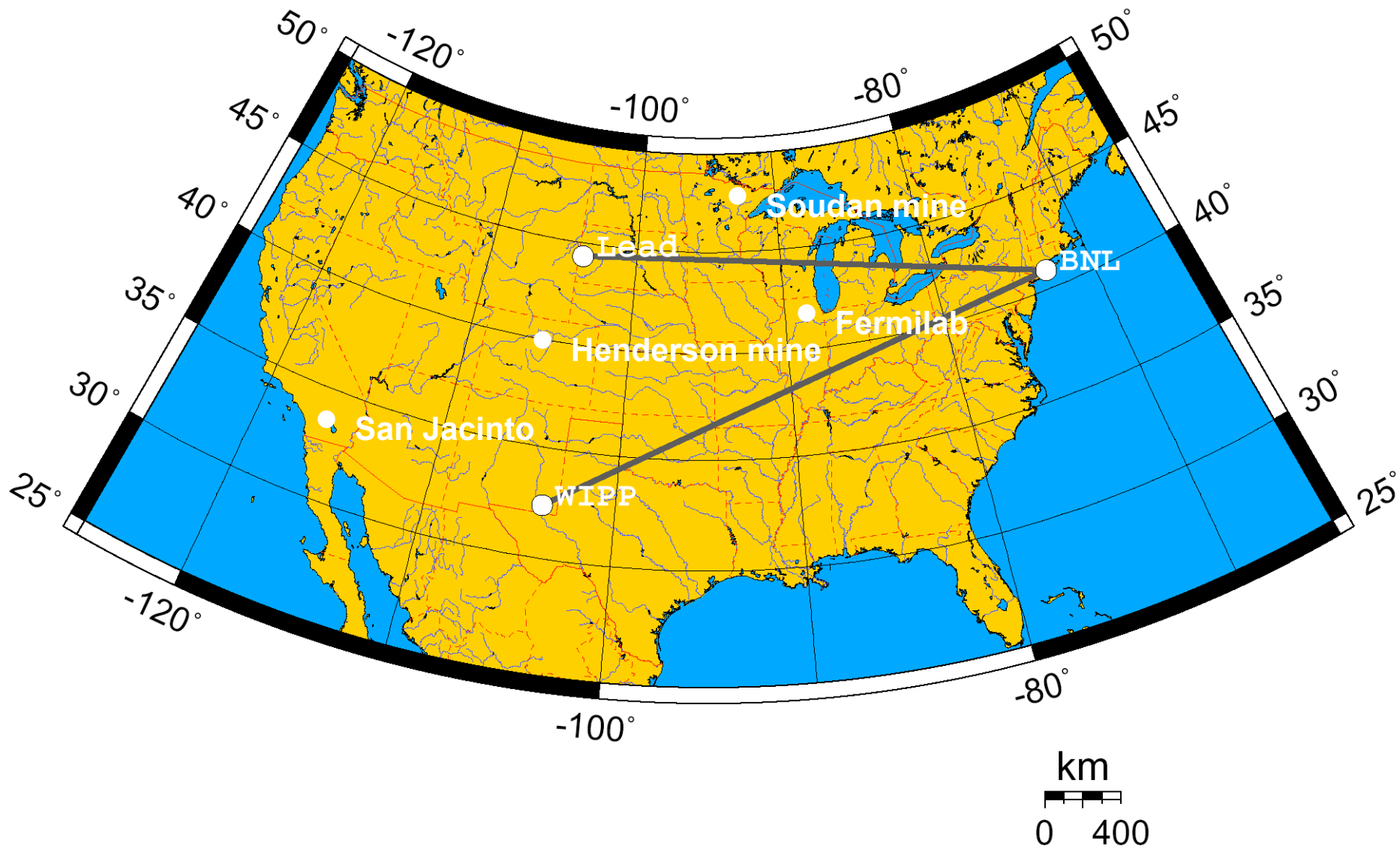
June 3, 2003



Detector Site Issues

- The most pressing issue for UNO
 - We must secure a site within next a few years
 - No site \square No experiment !
- Optimal Depth
 - 4000 mwe or deeper
 - \square Driven by the SRN search and Solar nu study
 - \square also reduce the risk of unknown B.G. to PDK searches at shallow depths
- Distance from Major Proton Accelerator Labs
 - Need flexibility
- Environmental Issues
 - Case of Gran Sasso:
<http://news.independent.co.uk/europe/story.jsp?story=411011>

Candidate Sites





Henderson Mine

- Homestake Mine

- Leading Candidate for NUSEL (NSF's Choice)
- Large Legal Uncertainty
 - no guarantee at this time
- We should support Homestake but urge rapid resolution
 - prepare backup sites

- Henderson Mine, Empire, Colorado

- March 12, 2003 Visit

Visitors: Hank Sobel, UC Irvine; Bernard Sadoulet, UC Berkeley; Todd Haines, LANL; Bob Svoboda, LSU; Chang Kee Jung, SUNY Stony Brook; Lee Petersen, CNAEngineers; Marvin Marshak, University of Minnesota



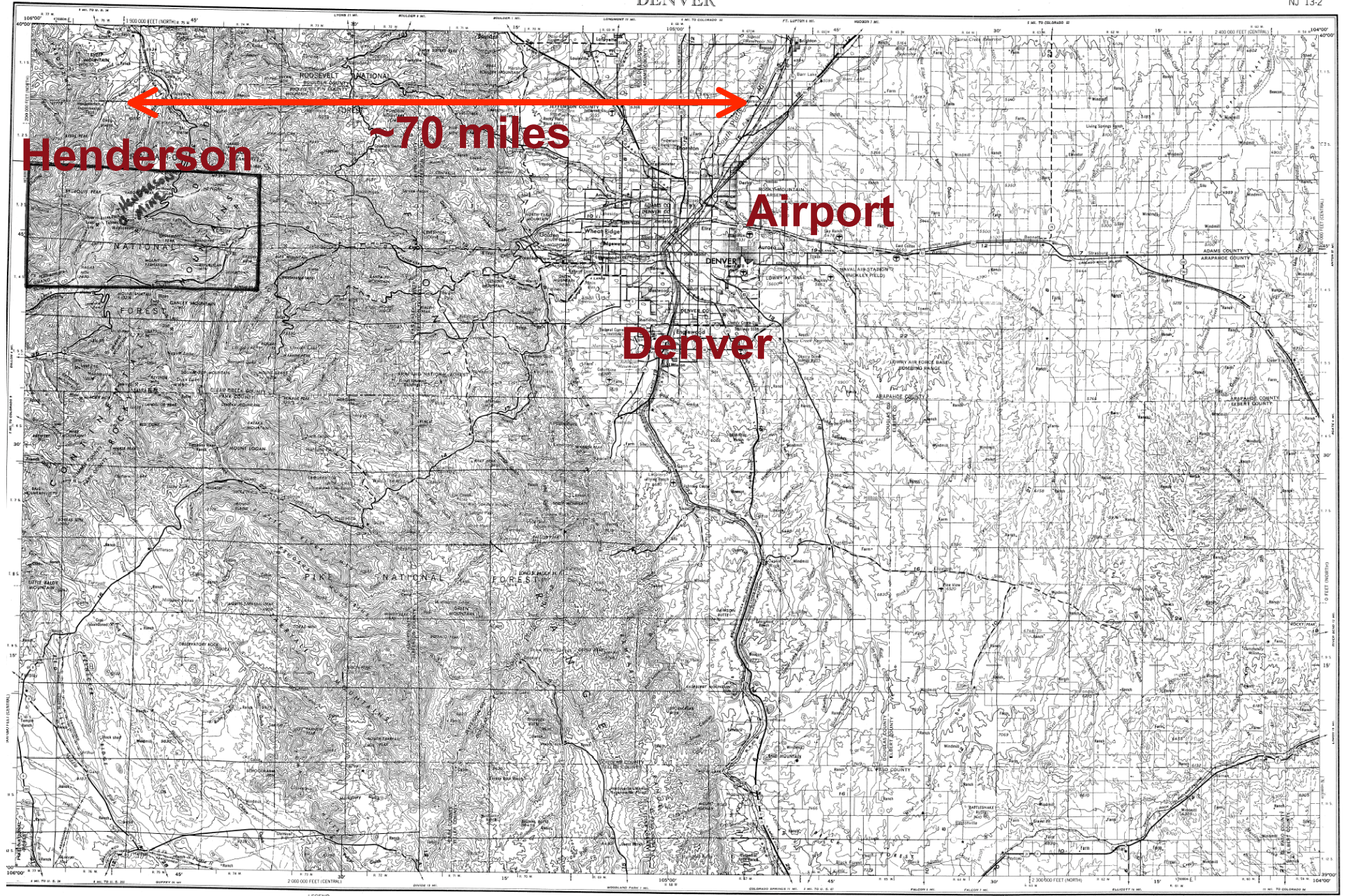
Continue: Henderson Mine

- Modern Molybdenum (Moly) mine owned by Phelps-Dodge
 - Established in 1970's
 - Better environmental control
- about 12 miles from I-70 and about 70 miles from Denver Airport
 - Excellent access and location
- Block-caving operation under Red Mountain
- #2 Shaft for hoisting (a total of 5 shafts)
 - Collar at 10,350 feet above sea level
 - 28 feet diameter w/ two hoisting compartments
 - The large hoist: 23' long by 8'6" wide by 13' tall w/ 20 tons normal capacity
 - fits a sea container
- Mining level
 - 6930 feet (~3000 mwe) and 8100 feet above sea level



Continue: Henderson Mine

- 10 mile long tunnel w/ a high speed conveyor belt and train track
 - Conveyor: 50kton/day max capacity, 20kton/day normal operation
- Rock temperature: ~120 degrees F
 - Natural cool air available year round
 - no mechanical cooling necessary
- Water
 - pumped from the lower levels and treated
- Power
 - 24 MW capacity w/ normal usage of about 10 MW
- Large office building and warehouses
- Anticipated mine closing in 10~20 years
 - Mine Co. and Local politicians see science as one possible way of revitalizing the area and a revenue source



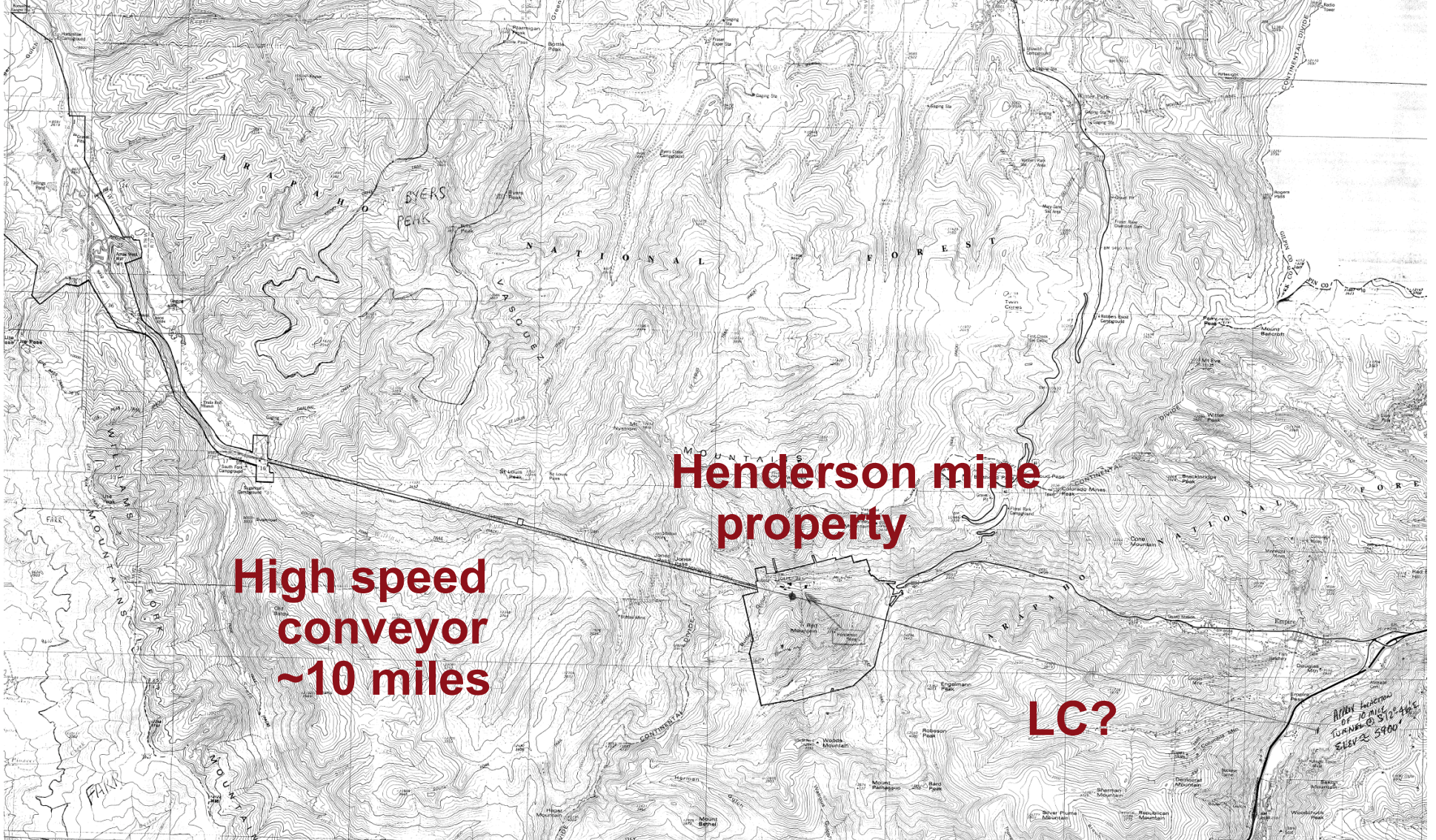
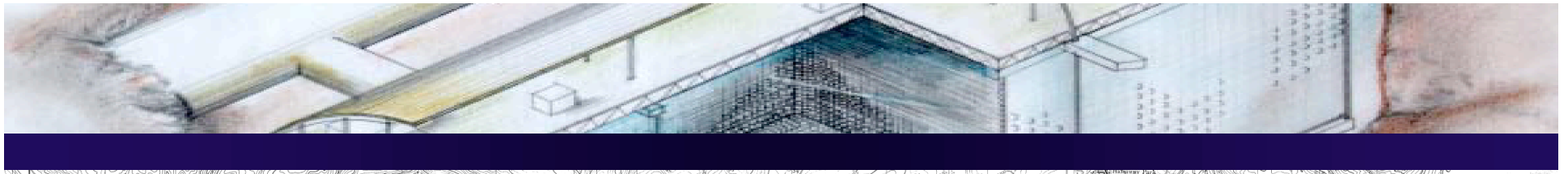
Printed by the Army Map Service (PSART), Corps of Engineers.

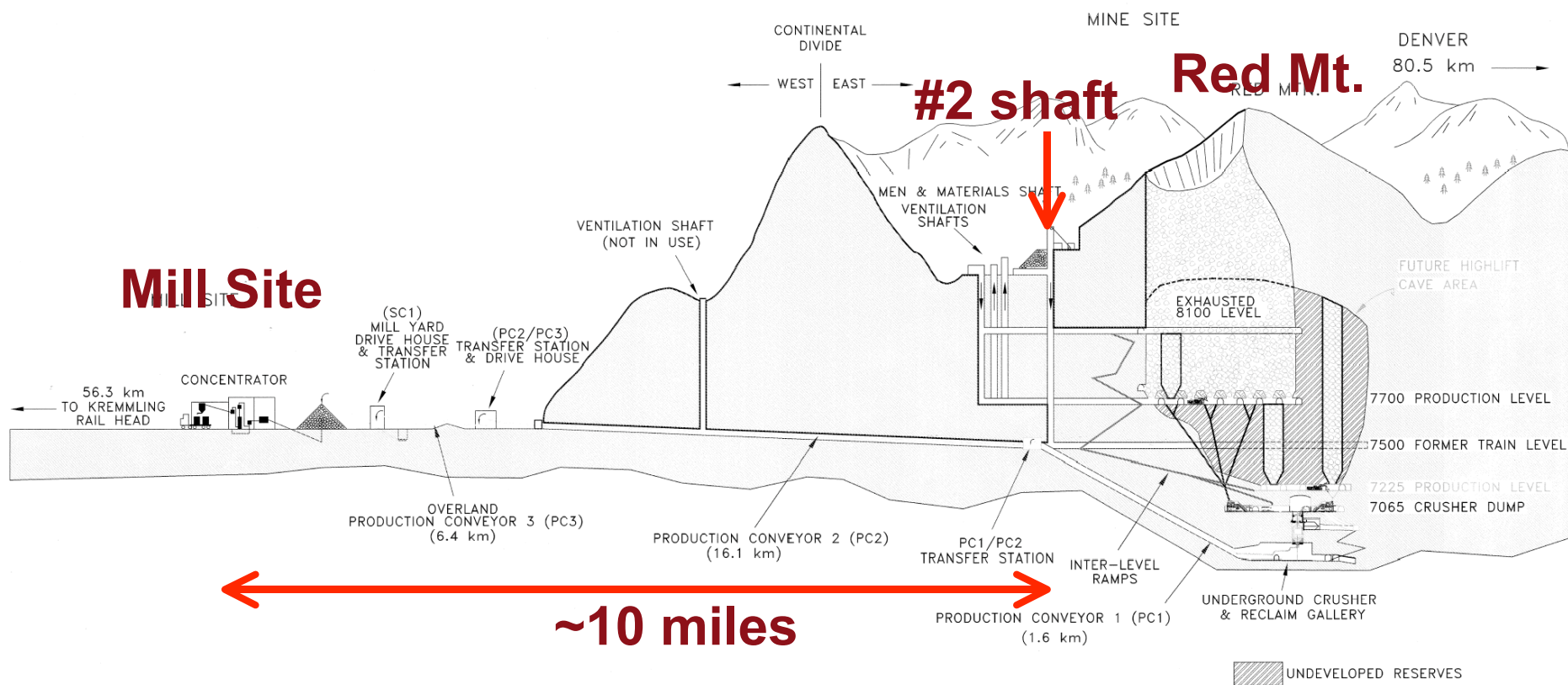
LEGEND
ROAD DATA 1963 PARTIALLY REVISED 1963
Figures in red denote approximate distances in miles between cities.

Scale 1:250,000

RELIABILITY DIAGRAM

INTERION-GEOLOGICAL SURVEY, WASHINGTON, D.C.-1966







Marvin's Summary

- Advantages:

- * Modern mine with good management and equipment
- * Nice location
- * Large capacity hoist
- * Existing staff to run mine and supervise safety

- Disadvantages

- * Working mine, share with mining, MSHA rules
- * Share single shaft with mining but no ore hoisting
- * Profit-making operation
- * Labs some distance from shaft (depending on mwe)



Preliminary Discussions and Future

- Harrison Mt. Geology
 - A detailed surface mapping in 1980's
 - Competent Precambrian Silver Plume Granite (PSPG) w/ a broken zone
 - A exploratory drill hole: made in 1968
 - Vast majority of the core: PSPG
 - competency: ~6 to 8 (w/ 9 being maximum)
 - More competent at deeper depth
 - Expect highly competent rock at the proposed UNO site
 - need new drilling to verify (\$100k/drilling)
- Preliminary excavation cost estimate: \$116M (30% contingency)
 - 1M m³ volume w/ two access drifts & surface treatment